

Comparison of adnexal torsion in premenopausal and postmenopausal women and risk of malignancy

Adnexal torsion in post-menopausal women

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Abstract

Aim: Adnexal torsion is one of the rare causes of lower abdominal pain, however, it is a common gynecological surgical emergency. Its prevalence is 2.7%. The incidence of torsion may be lower in post-menopausal women because of decreased risk of benign ovarian cysts and benign teratomas. Adnexal masses in post-menopausal patients are more likely to be malignant. However, there is not enough study to know precisely the risk of malignancy in post-menopausal patients with adnexal torsion.

Material and Methods: This study was carried out in a tertiary center in Turkey. The study retrospectively analyzed 380 patients presented to our clinic with abdominal pain between January 2005 and January 2020 and underwent surgery for adnexal torsion.

Results: The data were collected from patients records at a tertiary center in Turkey over a 15-year period. Three hundred eighty patients underwent surgery for adnexal torsion; 288 patients were premenopausal and 92 patients were postmenopausal. Fourteen ovarian malignancies and 11 borderline serous and mucinous tumors were reported; 11 (11.9%) ovarian malignancies were reported in post-menopausal patients and 3 (1.1%) in premenopausal patients. There were 6 serous cystadenocarcinoma, 4 mucinous cystadenocarcinoma, and 4 granulosa cell tumors that had been reported as malignancy histopathologic subtype.

Discussion: There is a longer delay in postmenopausal adnexal patients' treatment since postmenopausal adnexal torsion is an uncommon and unexpected gynecological emergency. Malignancy prevalence is high in the postmenopausal group, and surgeons should suspect malignancy in post-menopausal adnexal torsion patients.

Keywords

Adnexal Torsion, Detorsion, Ovarian Malignancy

DOI: 10.4328/ACAM.21165 Received: 2022-03-29 Accepted: 2022-06-06 Published Online: 2023-07-21 Printed: 2023-09-25 Ann Clin Anal Med 2023;14(Suppl 2):S125-129

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This study was approved by the Ethics Committee of Necmettin Erbakan University (Date: 2023-07-07, No: 4424)

Introduction

Adnexal torsion is not a common cause of lower abdominal pain, however, it is a common gynecological surgical emergency. Its prevalence is 2.7% [1]. It has been seen most frequently seen in women of childbearing age. Any part of adnexa can undergo torsion. Neoplasia or hyperstimulation of ovaries may result in torsion.

Since adnexal torsion has non-specific clinical findings, diagnosis and surgery are usually delayed. Acute onset of abdominal pain with clinical findings of peritonitis can be related with adnexal mass. However, sometimes diagnosis of adnexal torsion is challenging, with common symptoms [1].

Ultrasound is the initial method of diagnosis, especially blood velocity loss in Doppler ultrasound is a possible finding, however precise diagnosis of adnexal torsion is made intra-operatively [2].

As most patients are of reproductive ages, the preferred treatment is a minimally invasive approach laparoscopic detorsion and preservation of adnexa [3]. Necrosis in ovaries may occur due to a delay in diagnosis or treatment [4].

In the literature, there are enough studies to feel secure to manage conservatively premenopausal patients with adnexal torsion. However, a more aggressive approach can be needed in postmenopausal patients due to the increased risk of malignancy. The risk of adnexal torsion may be lower in postmenopausal women since the incidence of benign ovarian cysts and benign teratomas in postmenopausal patients is low. In postmenopausal patients, there is an increased risk of malignancy in adnexal masses [2,5]. However, there are not enough studies to know precisely the risk of malignancy in postmenopausal patients with adnexal torsion.

In this study, we describe our experiences with patients with postmenopausal adnexal torsion and hypothesized that adnexal torsion in post-menopausal patients is more likely due to malignancy and the physician should consider the risk of malignancy.

Material and Methods

This retrospective study was conducted between January 2005 and January 2020 in a tertiary center in Turkey. The study retrospectively analyzed 380 patients who presented to our clinic with abdominal pain between January 2005 and January 2020 and had surgery for adnexal torsion. Three hundred eighty patients were analyzed according to demographic characteristics, menopausal status, preoperative signs and symptoms, preoperative and postoperative hemoglobin (Hb) values, postoperative fever, white blood cell (WBC) count, preoperation time, operation time, hospital stay, surgical findings and applied surgical procedures, and pathological results. The twist of the ovary/adnexa of at least 360 degrees was defined as 'torsion'. Patients were defined as postmenopausal when patients reported 12 months of amenorrhea with or without menopausal symptoms. Data were compared between premenopausal and postmenopausal patients. All surgeries were performed by four gynecologists and staging surgeries were performed by two gynecologists specialized in gynecologic oncology.

Ethical Approval

Ethics Committee approval for the study was obtained.

Results

The data were collected from patients records at a tertiary center in Turkey over a 15-year period; 380 patients underwent surgery for adnexal torsion; 288 patients were premenopausal and 92 patients were postmenopausal. Mean age, gravidity, parity, mass size, preoperative time, operation time, hospital stay were significantly higher in postmenopausal group. There were significantly more patients who had necrosis in specimens in the postmenopausal group (Table 1).

Abdominopelvic pain was the most common symptom (95.8% and 91.3%) in both groups, and adnexal mass was the most common sign in both groups (93.1% and 89.1). Doppler ultrasound was performed for all patients; velocity loss was seen in 84.0% in the premenopausal group and in 80.4% in the postmenopausal group, nausea and vomiting were seen in 184 patients (63.8%) in the pre-menopausal group and 56 (60.8%) in the post-menopausal group; 324 patients had peritoneal signs (85.2%) and 39 patients had a fever (10.2%) There was no significant difference in symptoms and signs in both groups (Table 2).

Surgical operation details (adnexal detorsion, cystectomy, oophorectomy, total abdominal hysterectomy and bilateral salpingo-oophorectomy (TAH-BSO) and staging surgery) and the histopathological findings were also noted (Table 2). Detorsion and detorsion with cystectomy was significantly higher in the premenopausal group. TAH-BSO and TAH-BSO and staging surgery were significantly higher in the postmenopausal group. TAH-BSO was performed in postmenopausal patients. Unfortunately, out of working hours there was not any working pathologist, and there was also no chance of frozen pathological section in our center. Only in sixteen of postmenopausal patients, frozen sections could be taken since the operation was performed during working hours, 10 specimens were reported unidentified and 6 specimens were reported as benign. Other operations were performed during non-working hours, since patients had serious acute abdomen findings, therefore, additional staging surgery was performed in 52 (2 in premenopausal, 50 in postmenopausal) of these patients because of suspicion of malignancy based on the macroscopic appearance of the mass. The staging included pelvic wash for cytology, hysterectomy and adnexectomy, omentectomy and lymph-node sampling. The pathological results of these patients were malignant in 14 and borderline in 11 patients. Thus, the pathological result was consistent with malignancy in 48.0% of patients who underwent staging surgery.

Pathologic specimens were available for 322 of the 380 patients due to conservative surgery. Teratomas were the most common pathological finding in the premenopausal (n:92, 40.0%) and postmenopausal (n:26, 28.2%) groups. Fifty-two (22.6%) follicular cysts and 32 (13.9%) corpus luteum cysts were reported in pre-menopausal group, 9 (9.8%) fibromas were reported in postmenopausal group; 14 ovarian malignancies and 11 borderline serous and mucinous tumors were reported; 11 (11.9%) ovarian malignancies were reported in postmenopausal

Table 1. The characteristics of premenopausal and postmenopausal patients with adnexal torsion.

	Premenopause (n= 288)	Postmenopause (n= 92)	P-value
Age (y)	30.6 ± 9.6	59.8 ± 14.2	< 0.001 ^a
Gravidity	1.8 ± 0.8	5.6 ± 2.8	< 0.001 ^a
Parity	0.9 ± 0.8	3.4 ± 2.2	< 0.001 ^a
BMI (kg/m ²)	26.4 ± 2.8	28.8 ± 4.6	0.04 ^a
Mass size (cm)	9.2 ± 4.4	13.2 ± 8.2	<0.001 ^a
Pre-operative Hb values (g/dl)	11.4 ± 1.6	11.2 ± 1.3	0.58 ^a
Post-operative Hb values (g/dl)	10.5 ± 1.8	10.2 ± 1.6	0.62 ^a
White blood cell count (WBC, cells/ μ L)	10.8 ± 4.2	10.4 ± 3.5	0.68 ^a
Pre-operative time (h)	18.6 ± 16.2	66.8 ± 24.2	< 0.001 ^a
Operative time (min)	55.6 ± 10.8	88.7 ± 36.8	< 0.001 ^a
Hospital stay (d)	2.8 ± 2.2	5.5 ± 3.8	< 0.001 ^a
Presence of necrosis	168 (58.3%)	70 (76.1%)	< 0.001 ^b
Post-operative fever	12 (4.1%)	8 (8.7%)	0.03 ^b

Values are mean ± SD or number (percentage). BMI, body mass index. Hb, hemoglobin.
a, Student's t-test. b, χ^2 test.

Table 2. Patients' symptoms, signs and the details of surgical interventions.

	Premenopause (n= 288)	Postmenopause (n= 92)	P- value
Pelvic pain	276 (95.8%)	84 (91.3%)	0.48
Ovarian or adnexial mass	268 (93.1%)	82 (89.1%)	0.54
Peritoneal sign	258 (89.5%)	66 (71.7%)	0.32
Velocity loss in Doppler USG	242 (84.0%)	74 (80.4%)	0.62
Nausea and vomiting	184 (63.8%)	56 (60.8%)	0.42
Fever (> 38 °C)	28 (9.7%)	11 (11.9%)	0.12
Detorsion	58 (20.1%)	0	< 0.001
Detorsion + cystectomy	186 (64.5%)	0	< 0.001
Salpingo-oophorectomy	40 (13.9%)	0	< 0.001
TAH- BSO	2 (0.7%)	42 (45.6%)	< 0.001
TAH-BSO and staging surgery	2 (0.7%)	50 (54.3%)	< 0.001

USG, Ultrasonography, χ^2 test, TAH-BSO: Total abdominal hysterectomy + bilateral salpingo-oophorectomy.

Table 3. Pathological findings of ovarian torsion.

	Premenopause (n= 230*)	Postmenopause (n= 92)	P- value
Teratoma	92 (40.0%)	26 (28.2%)	< 0.001
Follicular cyst	52 (22.6%)	0	< 0.001
Corpus luteum cyst	32 (13.9%)	0	< 0.001
Serous cystadenoma	12 (5.2%)	20 (21.7%)	< 0.001
Mucinous cystadenoma	10 (4.3%)	12 (13.0%)	0.02
Endometrioma	12 (5.2%)	2 (2.1%)	0.03
Fibroma	2 (0.9%)	9 (9.8%)	< 0.001
Ovarian malignancy**	3 (1.3%)	11 (11.9%)	< 0.001
Borderline tumor	3 (1.3%)	8 (8.7%)	< 0.001
Unclassified	12 (5.2%)	4 (4.3%)	0.36

*Pathologic specimens were available for 322 patients, 230 in pre-menopausal and 92 in post-menopausal **Six serous cystadenocarcinomas, four mucinous cystadenocarcinomas and four granulosa cell tumors

patients and 3 (1.3%) were reported in premenopausal patients. There were 6 serous cystadenocarcinomas, 4 mucinous cystadenocarcinomas, and 4 granulosa cell tumors were reported as malignancy histopathologic subtype. There were 3 (1.3%) borderline tumors in the premenopausal group and 8 (8.7%) in the postmenopausal group. There were significantly higher ratios of teratomas, follicular cysts, corpus luteum cysts in premenopausal patients' pathological findings. In the postmenopausal group, the rates of serous cystadenomas, fibromas, ovarian malignancies, and borderline tumors were significantly higher (Table 2).

Discussion

Adnexal torsion is a gynecological emergency and should be diagnosed and treated as early as possible to save the ovarian tissue. In the differential diagnosis of acute pelvic pain in premenopausal patients, adnexal torsion comes to mind first. However, in postmenopausal patients, since it is a rare condition and there is no concern for fertility protection, diagnosis can be delayed.

In postmenopausal adnexal torsion patients, Ozcan et al. reported that there was no difference in symptoms and signs at the presentation from premenopausal patients, however they found a significant delay in surgical treatment for postmenopausal patients [6]. In our study, we found no significant difference in symptoms and signs between postmenopausal and premenopausal patients. But preoperative time was significantly lower in premenopausal patients. Surgery was performed on postmenopausal patients later than an excess delay of almost 50 hours. Although both groups had similar symptoms and clinical findings, this delay could be due to the fact that physicians usually do not suspect adnexal torsion in the differential diagnosis in older women.

We had found significantly more tissue necrosis in postmenopausal patients due to delay in surgery. However, there is no increased risk of thromboembolism due to necrosis of the tissue [7]. In our study, we also found that operation time and hospital stay were significantly longer in the post-menopausal group. Because in the postmenopausal group, more aggressive surgery was performed. In the premenopausal group, we performed two TAH-BSO and two staging surgeries, however, in the post-menopausal group, we performed forty-two TAH-BSO and fifty staging surgeries. Eitan et al. also reported significantly longer operation time and hospital stay in the postmenopausal group [6].

In adnexal torsion, ultrasound is the first-choice modality in imaging ovaries, because, when performed, especially with Doppler flow, it has good diagnostic performance and lower cost. However, a definite diagnosis of adnexal torsion is often made intra-operatively [2]. In our study, we found velocity loss on Doppler ultrasound in 84.0% in the premenopausal group and 80.4% in the postmenopausal group. There was no significant change between the two groups.

Pathological findings in both groups differ significantly; in the premenopausal group, the most common pathological diagnosis was benign teratoma. Respectively follicular cysts and corpus luteum cysts occupy the second and third place. In the postmenopausal group, teratomas are the most common

pathological diagnosis. Respectively serous cystadenomas and malignancies are the second and third most common pathological diagnosis.

The incidence of malignancy in all patients was 3.7% (n=14), in the premenopausal group, it was 1.3% (n=3), in the postmenopausal group, it was 11.9% (n=11). There was a significant difference in malignancy incidence between both groups.

In previous studies, Hermann et al. found the risk of malignancy in 3% of 33 postmenopausal patients, whereas Ozan et al. found the risk of malignancy in 16% of 25 post-menopausal patients [6, 8]. In a study by Huchon C. et al., the incidence of malignancy was 25% in 37 women with torsion and older than 60 years [9]. Although in another study, Koonings et. al reported 19 adnexal torsions in postmenopausal patients and no malignancy was reported in their study.

We observed 6 serous cystadenocarcinomas, 4 mucinous cystadenocarcinoma, and 4 granulosa cell tumors among malignancies. In the literature, there are no studies reporting histopathological subtypes of malignancies, which were seen in ovarian torsions in postmenopausal patients.

In their studies, Spinelli et al. and Balci et al. reported that delays in the diagnosis of adnexal torsion in postmenopausal patients were caused by ovarian necrosis, which affects the reliability of frozen section results [10,13]. In our study, 16 frozen sections were taken from postmenopausal patients, since surgeries had been performed as an emergency in non-working hours, 10 specimens were reported unidentified due to necrosis, and 6 specimens were reported as benign. Fifty-two patients had staging surgery due to suspicion of malignancy on macroscopic appearance, and 14 malignant and 11 borderline tumors (48%) were reported. Staging surgeries were performed by gynecologists who specialized in oncologic surgery in suspicion of malignancy before the operation due to ultrasound findings (semi solid appearance, thick cysts wall, thick septations and size of the mass).

In staging surgery, we performed peritoneal washing cytology, TAH+BSO, omentectomy, lymph node dissection, and appendectomy. Fourteen malign cases were optimally cytoreduced. In 11 cases, capsule intact and the absence of lymph node metastases, malign cell negative peritoneal washing cytology (early stage) were reported. In 3 cases, the capsule was not intact, there were pelvic lymph node metastases and malign cell positive peritoneal washing cytology. There were no distant metastases or bowel implants or splenic metastases in all cases.

We observed that intra-operative pathological frozen section results were not helpful. Surgeons should make their decisions carefully, the suspicion of malignancy in the macroscopic appearance of mass and patient's clinical findings should be considered carefully while deciding the aggressiveness of the surgery. The unreliability of the frozen section results in adnexal torsions could be due to necrosis of the tissue, which can be the result of a delay in diagnosis. If the delay in diagnosis could be shortened, this disadvantage could be prevented.

Our study is one of the largest studies examining

postmenopausal adnexal torsions in the literature. Although the number of patients was high, this was a one-centered study, and four physicians performed surgeries, which decreases bias due to physicians' different management styles.

The major limitation of our study is the retrospective nature of the clinical data. The study includes only women who were diagnosed with adnexal torsion, and there is a possibility that there was an underdiagnosis that have led to a diagnostic bias. Although this was a retrospective study, there are not enough published studies in the literature on this subject to date, which makes this work important, even its limitations.

Conclusion

There is a longer delay in postmenopausal adnexal patients' treatment because post-menopausal adnexal torsion is an uncommon and unexpected gynecologic emergency. Malignancy prevalence is high in the postmenopausal group, and surgeons should suspect malignancy in postmenopausal adnexal torsion patients.

Scientific Responsibility Statement

The authors declare that they are responsible for the article's scientific content including study design, data collection, analysis and interpretation, writing, some of the main line, or all of the preparation and scientific review of the contents and approval of the final version of the article.

Animal and human rights statement

All procedures performed in this study were in accordance with the ethical standards of the institutional and/or national research committee and with the 1964 Helsinki Declaration and its later amendments or comparable ethical standards. No animal or human studies were carried out by the authors for this article.

Funding: None

Conflict of interest

None of the authors received any type of financial support that could be considered potential conflict of interest regarding the manuscript or its submission.

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How to cite this article:

Osman Balci, Hasan Energin. Comparison of adnexal torsion in premenopausal and postmenopausal women and risk of malignancy. *Ann Clin Anal Med* 2023;14(Suppl 2):S125-129

This study was approved by the Ethics Committee of Necmettin Erbakan University (Date: 2023-07-07, No: 4424)